

Rec'd PCT/PTO 20 AUG 2004  
The Patent Office  
COPYRIGHT • TRADE MARKS

1-B/3100723  
1/505306



INVESTOR IN PEOPLE



## PRIORITY DOCUMENT

SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH RULE 17.1(a) OR (b)

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

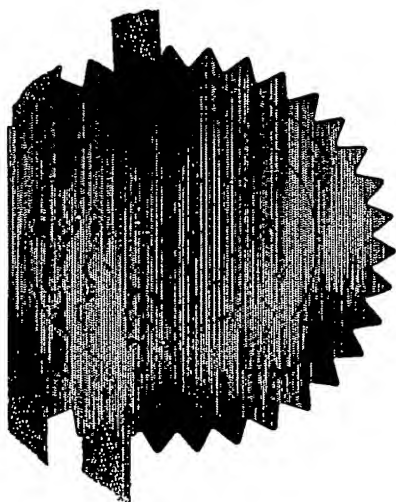
REC'D 14 MAR 2003	
WIPO	PCT

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.



Signed

*Andrew Gersey*

Dated

6 March 2003

**BEST AVAILABLE COPY**

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office

Cardiff Road  
Newport  
South Wales  
NP9 1RH

1. Your reference P34086GB/NJMH

2. Patent application number  
(The Patent Office will fill in this part)

25 JUN 2002

0214657.9

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Royal College of Art, Kensington Gore, London, SW7 2EU  
- and -  
Nicholas Oxley c/o Royal College of Art, Kensington Gore,  
London, SW7 2EU

08410854001

08410896001

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

4. Title of the invention

SELF-STABILISING SUPPORT

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Kilburn & Strode  
20 Red Lion Street  
London  
WC1R 4PJ

Patents ADP number (if you know it)

125001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

YES

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.  
Do not count copies of the same document

Continuation sheets of this form

Description	5
Claim(s)	1
Abstract	ODM
Drawing(s)	1+1

10. If you are also filing any of the following, state how many against each item.

Priority documents	0
Translations of priority documents	0
Statement of inventorship and right to grant of a patent (Patents Form 7/77)	0
Request for preliminary examination and search (Patents Form 9/77)	1 ✓
Request for substantive examination (Patents Form 10/77)	0
Any other documents (please specify)	0

11. I/We request the grant of a patent on the basis of this application.

Signature

Date 25/06/02

*N J M Hedley*

12. Name and daytime telephone number of person to contact in the United Kingdom  
N J M Hedley  
Tel: 020 7539 4200

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

## Self-Stabilising Support

### Technical Field

5 The present invention relates to a support for use in providing stable support for structures, even on an uneven horizontal surface. It is particularly applicable to provide support for furniture, such as chairs, tables, beds, benches, chests of drawers, shelving units and pedestals, e.g. supports for electronic or scientific equipment such as televisions and monitors, but also can be applied in any other field where a stable support is required.

10

### Background Art

When furniture supported on four legs is placed on an uneven floor, all four legs do not necessarily engage the floor and if not the furniture can wobble i.e. it is prone to unwanted and often disturbing rocking motion.

15

Although three legged supports are not prone to rocking, they are inherently less stable than four legged supports and can more easily be toppled over, especially when the centre of gravity of the supported structure is not located towards the middle of the three legged support.

20

The present invention provides a support having four legs that can all engage the surface on which they are standing even when that surface is uneven.

### Disclosure of the Invention

25

According to the present invention, there is provided a self-stabilising support comprising a first pair of legs, means connected to the first pair of legs for supporting a structure and a second pair of legs pivotable with respect to the first pair of legs about an axis whereby the four legs of the first and second pair can, by suitably pivoting the second pair of legs with respect to the first pair, be

firmly planted, even on an uneven surface, such as a floor, to support the said structure.

5 According to the second aspect of the present invention, there is provided an article of furniture supported on legs, the legs being formed by the support as defined above.

10 The axis about which the second pair of legs rotates cannot be vertical and is preferably generally horizontal in use. Rotation about a horizontal axis minimises the alteration in the position of the structure if the second pair of legs are rotated out of exact alignment with the first pair of legs. Rotation about an axis having horizontal and vertical components is possible but less preferred. The axis preferably extends perpendicular to a line (or more strictly a projection of a line) joining the feet of the first pair of legs (the "feet" being  
15 the ends of the legs that engage the ground.)

It is preferred that the only substantial relative motion between the first and second pairs of legs is rotation about the axis since otherwise the support structure will not be rigid.

20

The pivoting motion of the second pair of legs is preferably achieved by a bearing assembly, for example an axle secured to one of the pairs of legs and a sleeve bearing attached to the other pair of legs and rotatable on the said axle. However other types of bearing are useable in the present invention.

25

### **Brief Description of Drawings**

A chair according to the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is the side view of the chair;

Figure 2 is a rear view of the chair;

Figure 3 is a view looking up at the bottom of the chair;

Figure 4 is a detailed view showing the connection between the front and rear legs of the chair shown in Figures 1 to 3; and

5 Figure 5 is a rear view of the chair similar to Figure 2 but shows the chair legs pivoted with respect to each other to enable it to stand on uneven ground.

### **Best Mode for Carrying out the Invention**

10 The chair depicted in the accompanying drawings includes a pair of front legs 1, a rear pair of legs 2 and a seat 3. The seat 3 is fixed to the front legs by bolts (not shown) passing through the seat and engaging in threaded holes (not shown) in the front legs. It is important that the seat is not rigidly supported by the second pair of legs since otherwise the pivoting motion of the two pairs of  
15 legs described below cannot take place. In this instance, the seat 3 is not directly connected to the rear set of legs at all.

The rear set of legs is pivotally attached to the front set of legs by an arrangement shown in Figure 4. In Figure 4, front legs include an internally  
20 threaded bore 5 in the region 4 where the front legs converge. A threaded portion 7 of a threaded axle 6 is screwed into, and hence firmly engaged in, the threaded bore 5. The threaded axle 6 also includes a smooth cylindrical axle portion 8, which projects rearwardly from the front legs 2, and a shoulder 12 between the threaded portion 7 and the cylindrical axle portion 8. The shoulder  
25 abuts the front legs (i.e. comes to a hard stop) when the threaded portion 7 has been fully screwed into the bore 5.

The rear pair of legs 2 includes a bore 9 having a pair of ball bearings 10, 11 secured by their outer race to the wall of the bore 9. The axle portion 8 extends

through the bore 9 and engages the inner races of the ball bearings 10,11; the bearings 10, 11 allow the rear legs 2 to pivot about the axle 8. An end cap 14 is secured by means of a screw thread 15 in the end of the axle 8 and sits in the bore 9 engaging the inner race of the ball bearing 11 and closing off one end of the bore 9 and retaining the axle 8 within the bore.

A wave spring 16 is located between the shoulder 12 and the inner race of ball bearings 10 and provides an axial force to constrain the axial motion between the first and second legs.

10

As is evident from Figure 4, the rear legs can pivot about axle 8 with respect to the front set of legs 1. Preferably, only limited rotation of the rear legs is permissible and stops (not shown) are included to limit the relative rotation.

15

The preferred arc of rotation is less than  $20^\circ$ , e.g.  $5^\circ - 10^\circ$ . This allows the rear legs to adjust to unevenness in the floor on which the chair is placed so that all four legs are firmly set on the floor. This is shown in Figure 5, where the front legs are supported on contour 21 of an uneven surface and rear legs are supported on a different contour 22 as a result of the rear legs 2 pivoting about an axis.

20

Although one form of bearing has been disclosed, many other alternative designs are of course possible and the present application is not limited to the particular bearing shown and described.

25

Although the seat 3 is not directly connected to the rear set of legs 2 at all in the embodiment described above, it is possible for the rear legs also to support the seat if such support allows the pivoting movement described above. This will generally be possible if the connection between the seat and the rear legs is a bearing about an axis co-linear with the axis of the axle 8.

The stability of the chair is increased if its centre of gravity 25 is spaced apart from the axle 8 preferably by a horizontal distance  $A$  greater than a threshold; this threshold value depends on the particular geometry of the chair. The larger  
5 the distance, the greater is the stability of the chair but obviously other considerations must also be taken into account, e.g. the user requirement dictating the overall size and design of the chair.



## CLAIMS

1. A self-stabilising support for a structure comprising a first pair of legs, means connected to the first pair of legs for supporting the structure and a  
5 second pair of legs pivotable with respect to the first pair of legs about an axis whereby the four legs of the first and second pair can, by suitably pivoting the second pair of legs with respect to the first pair, be firmly planted on an uneven surface to support the said structure.

10 2. A support as claimed in claim 1 wherein, in use, the axis lies in a generally horizontal plane.

3. A support as claimed in claim 1 or claim 2 wherein the axis extends generally perpendicularly to a notional line joining the ends of the legs of the  
15 first pair that engage the ground.

4. A support as claimed in any one of claims 1 to 3, wherein the only substantial relative motion between the first and second pairs of legs is the said  
20 pivoting about the axis.

5. A support as claimed in any one of claims 1 to 4, which includes a bearing assembly between the first and second pair of legs that allows the said pivoting motion about the axis.

25 6. A support as claimed in any one of claims 1 to 4, wherein centre of gravity of the article is spaced apart in a horizontal direction from the axle.

7. An article of furniture supported on legs, the legs being formed by the support as defined in any one of claims 1 to 6.

*Spare*

1/1

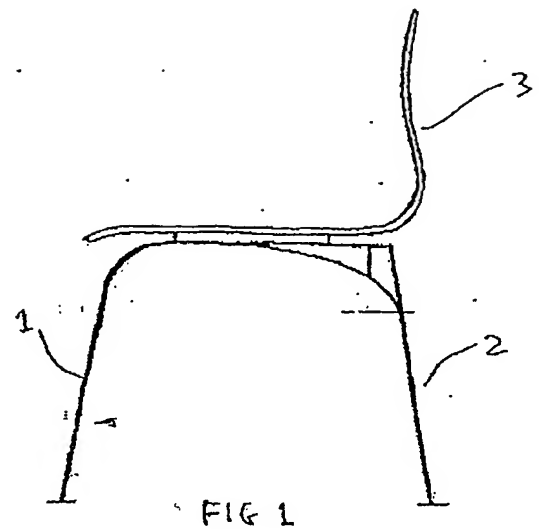


FIG 1

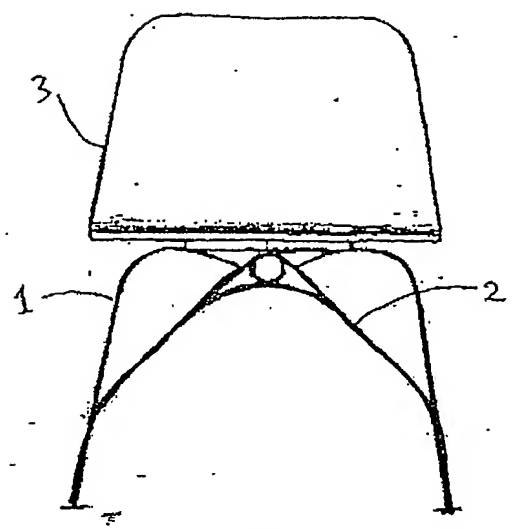


FIG 2

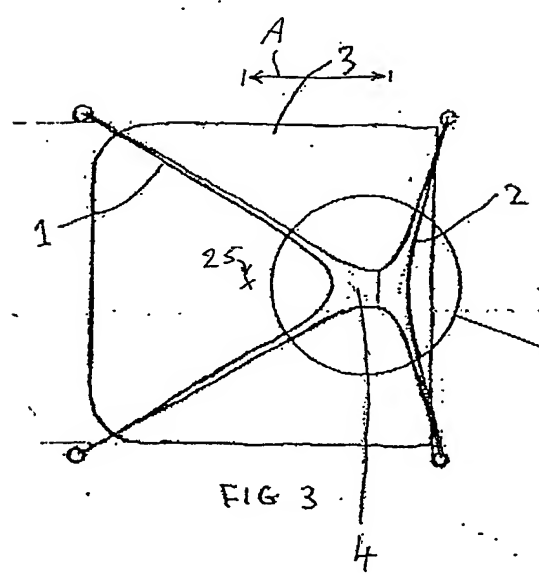


FIG 3

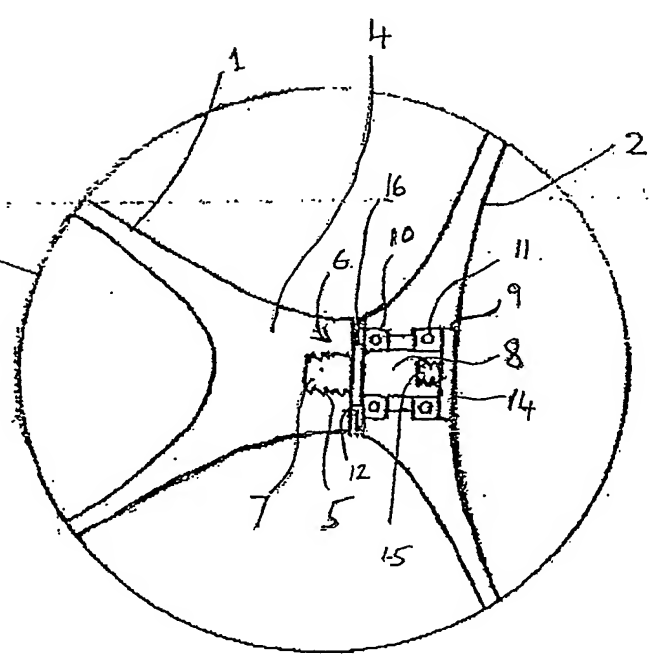


FIG 4

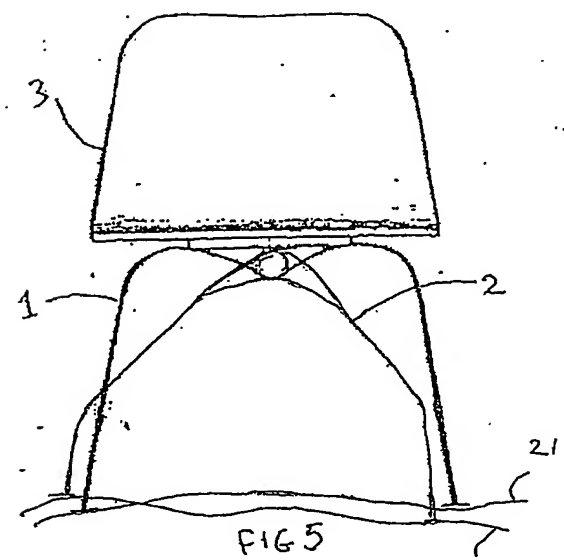


FIG 5

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**